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# GEOGRAPHICAL RECORD

## THE AMERICAN GEOGRAPHICAL SOCIETY

**Lectures and Elections to Fellowship.** In the last issue of the *Geographical Review* announcement was made of the speakers and subjects at the January and February meetings. In addition there were given two lectures in the technical series at the home of the Society, Broadway at 156th Street, as follows:

On February 8th Dr. E. L. Stevenson addressed the Society on the subject of "Maps in the American Geographical Society's Collection Relating to Early Exploration and Discovery." There was distributed at the lecture a pamphlet of twenty-one pages, especially prepared for the occasion, entitled:

### A DESCRIPTION OF EARLY MAPS

*Originals and Facsimiles*  
(1452-1611)

Being a part of the permanent wall exhibition of  
The American Geographical Society  
With a partial list and brief references to the re-  
productions of others which may be consulted in  
the Society's Library.

Under each main map title in the pamphlet there is about a page of text description together with a brief list of references.

It was the good fortune of the Society to have Dr. D. G. Hogarth, of Oxford University, give a special illustrated lecture, Tuesday evening, March 1, on "Recent Explorations in Arabia." There was an attendance of over four hundred Fellows and friends, and an unusually high degree of interest. An illustrated article by Dr. Hogarth will appear in the July number of the *Geographical Review* on the subject of his lecture.

At the Society's building on April 12 Alan G. Ogilvie, of the staff of the Society, will give an illustrated lecture on Macedonia. Mr. Ogilvie was a Captain in the British Army during the war, spending most of the war period in surveying portions of Macedonia. He is the author of an article on that subject in the present number of the *Review*, and of a number of papers in the *Geographical Journal* (London). Mr. Ogilvie is a graduate of Oxford University and was Reader in Geography at the University of Manchester at the time his present appointment was made.

At the January, February, and March meetings, President Greenough presiding, there were presented with the approval of the Council the names of 224 candidates who were duly elected as Fellows of the Society. An account of the annual meeting of the Society involving the election of officers is given in the following paragraphs.

**Annual Reports of the Society.** At the annual meeting of the American Geographical Society held on January 25 at the Engineering Societies' Building, 29 West Thirty-ninth Street, the annual reports of the Council, of the Treasurer, and of the Special Committee were read, as follows:

### REPORT OF THE COUNCIL

January 20, 1921

The Council presents herewith a brief review of the activities of the Society during the past year. These have recovered in large measure from the dislocation caused by the Great War.

The work of the Society has been directed toward the achievement of two principal objects: the first seeking to meet the interest of our Fellows through the *Geographical Review*, the *Annals of the Association of American Geographers*, the monographs, and the

lectures; the second involving an effort to add to the permanent fund of geographical knowledge by original research and exploration. The results of the latter endeavor must necessarily be restricted by the limited means at the command of the Society, but we are gratified to announce that through the generosity of some of the Council we have been able this year to initiate an extended scheme of intensive scientific research in the geography of Hispanic America and Brazil.

The first step in the development of the program aims at the review and classification of all available scientific data of a geographical nature that pertain to Hispanic America. Topographic data of all kinds, climatic facts, and population statistics are of first importance. Account is taken of everything in man's physical environment that affects his distribution, his activities, and his economic welfare. While such a study reaches back into history it is most concerned with present conditions and the possibilities of the immediate future. The work will involve the compilation of maps—topographic and distributional—on various scales; but always including sheets on the scale of 1:1,000,000 which will conform to the scheme of the International Map. It further includes the production of complete distributional maps of Hispanic America dealing with soil, vegetation, and land classification. The undertaking proposed is an ambitious one, but the Society is happy to say that assurances of co-operation have been given by the whole group of Hispanic American countries in a cordial spirit that augurs well not only for immediate scientific results but also for the fostering of mutual understanding and sympathetic relationship towards which the field of geography offers a peculiarly fortunate approach. Details of progress will be presented from time to time to our Fellows through the columns of the *Review*.

The *Geographical Review*, which has heretofore been published as a monthly periodical, will hereafter be changed to a quarterly issue, giving it a more permanent shape which it is hoped will meet with your approval. Various technical considerations as well have contributed to this decision.

The projected series of monographs in the Research Series, alluded to at our last Annual Meeting, has advanced so that it includes altogether fourteen numbers. The two leading publications are now in press and are entitled, "The Battlefields of the World War: A Study in Military Geography," by Professor D. W. Johnson, of Columbia University, about 600 pages, 170 illustrations; and "The New World: Problems in Political Geography," by Dr. Isaiah Bowman, Director of the American Geographical Society, 600 pages with over 200 maps and 60 photographs. Order cards for these monographs have already been distributed to our Fellows.

Additions to the Library comprise 1,406 books, 519 pamphlets, 5,308 periodicals, 3,482 maps, and 34 atlases. Our collection now comprises 57,210 books and pamphlets, 50,643 maps and atlases.

The gold medals of the Society were awarded as follows: The Charles P. Daly Medal to Dr. George Otis Smith, Director of the United States Geological Survey, Washington, D. C.

The David Livingstone Centenary Medal to William Speirs Bruce, of Edinburgh, Scotland, for his distinguished work in the Antarctic.

The David Livingstone Centenary Medal to Alexander Hamilton Rice, New York, for explorations of north-western Amazonas.

The lectures of the Society have been well attended and have given general satisfaction. These, eleven in number, were given by the following speakers: Dr. Charles Upson Clark, Professor Clarence H. Young, Archdeacon Hudson Stuck, Mr. Carl Lumholtz, Professor Henry E. Crampton, Dr. Fay-Cooper Cole, Dr. George Otis Smith, Mr. Edgar J. Banks, Mr. Roy Chapman Andrews, Baron Gerard de Geer, and Dr. Alexander Hamilton Rice.

The number of Fellows of the Society is 3,307, of whom 397 are Life Fellows.

The Report of the Treasurer, submitted herewith, gives a summary of the income and expenses of the Society, together with a condensed balance sheet showing a satisfactory financial condition.

In conclusion, it may be said that the organization was never better fitted for the purpose it is designed to serve and the hope is entertained that its disinterested efforts are appreciated by the community. Our acknowledgments are due to all the members of the staff for their efficiency and devotion.

Respectfully submitted on behalf of the Council.

JOHN GREENOUGH  
Chairman

## REPORT OF THE TREASURER FOR 1920

The following is a statement of the receipts and expenses and the condensed balance sheet of the Society as shown by the books on December 31, 1920:

*Receipts and Expenses*

On December 31, 1919, there was at balance of income account.....	\$2,377.14
During the year there have been received from annual dues, interest on investments, and sales of publications.....	\$61,049.49
Special donations.....	13,000.00
	<hr/> 74,049.49
	76,426.63

There has been expended for salaries, house expenses, library, meetings, publications, postage, insurance, etc. ....	75,961.03
	<hr/>

Balance of income account December 31, 1920.....	\$465.60
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*Condensed Balance Sheet*

Cash.....	\$30,781.99	Capital uninvested.....	\$1,872.96
Temporary investments.....	45,041.76	Annual dues paid in advance..	330.00
		Monograph Publication Fund	11,008.44
		Hispanic American Research Fund .....	33,480.24
		Sundry deposits and reserves..	21,166.51
		Special deposit.....	7,500.00
		Income account balance....	465.60
	<hr/>		<hr/>
	\$75,823.75		\$75,823.75
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HENRY PARISH  
*Treasurer*

## REPORT OF THE SPECIAL COMMITTEE

January 25, 1921

The Special Committee appointed December 16, 1920, to nominate and invite suitable persons to fill vacancies which will occur in the offices of the Society at the date of its annual meeting in January, 1921, respectfully report that they recommend the election of the following gentlemen to the offices designated:

	TERM TO EXPIRE IN
President.....	John Greenough..... 1922
Vice-President.....	Alexander Hamilton Rice..... 1924
Foreign Corresponding Secretary.....	William Libbey..... 1924
Treasurer.....	Henry Parish..... 1922
	{ Edwin Swift Balch
	{ Banyer Clarkson
	{ H. Stuart Hotchkiss } ..... 1924
Councilors.....	{ Walter B. James
	{ Frank L. Polk
	{ Franklin D. Roosevelt } ..... 1923
	{ Roland L. Redmond }
Philip W. Henry	} <i>Committee</i>
W. Redmond Cross	
Paul Tuckerman	

The reports of the Council and the Treasurer were approved and ordered on file. The persons recommended by the Special Committee for the offices to be filled received the unanimous vote of the Society and were declared duly elected.

## NORTH AMERICA

**Weather and Crop Yields in the United States.** The detailed study of weather and crop relations has led to recognition of one or more critical periods in the growth of a crop, when its future prospects are largely determined. Thus, for corn, Professor J. Warren Smith has shown that the time when an extra half inch or quarter inch of rain is most valuable, is the 10 days immediately following the blossoming. The temperature as well as the moisture of a critical period exercises an important control over crop development. For instance, in the case of the cotton belt for the best yield of cotton May should be dry, June both warm and dry, and August cool and wet. It has proved possible to predict the yield of cotton more accurately from mathematical analysis of these weather factors than from the reported condition of the crop itself. Mr. T. A. Blair has summarized these and other interesting results of investigations of this sort in a recent article, "The Mathematician, the Farmer and the Weather" (*Scientific Monthly*, October, 1920, pp. 353-361). He points out that careful determination of the heat and moisture requirements of a particular crop during its critical periods, coupled with detailed climatic analysis of a region, will indicate whether or not that crop is climatically adapted to that locality. "Further, there are ways of advancing or retarding, within certain limits, the time of occurrence of the critical periods, thus bringing them into the time when favorable weather is more likely to occur."

Mr. H. A. Wallace in a "Mathematical Inquiry into the Effect of Weather on Corn Yield in the Eight Corn Belt States" (*Monthly Weather Rev.*, August, 1920, pp. 439-446) has recently extended Professor J. Warren Smith's work on the yield of corn in Ohio (see his book, "Agricultural Meteorology," 1920). Mr. Wallace concludes that "the problem of predicting corn yield from the weather is relatively simple in the southern half of the corn belt, notably in Kansas, Missouri and southern Illinois, where drought and heat in June, July and August are the chief influences." In the north, however, as in Iowa and Minnesota, the departures of the monthly means of temperature and rainfall from the average show a disappointingly small correlation with the total yield of corn for each State. It appears that better results would be obtained with the use of the county as the unit of area and by dividing the time into phenological periods rather than into the arbitrary calendar months. Furthermore, it is obvious that along the northern border of the corn belt, an early killing frost might reduce to silage the crop from large areas for which previous weather had indicated heavy prospective yields of grain. Under such conditions only the yield per acre actually harvested for grain could be expected to show any marked relation to the weather previous to the frost.

Some numerical estimates have been compiled by the U. S. Bureau of Crop Estimates (see the *Monthly Weather Rev.*, August, 1920, p. 446) showing the effect of adverse weather on the yields of 12 important crops. In the period 1909 to 1919 the yield of wheat was cut 22.9 per cent by deficient or excessive moisture, by floods, frost or freeze, hail, hot winds and storms; but only 6.9 per cent by the combined effect of plant disease, insect and animal pests, and defective seed. The adverse weather factors experienced reduced the yield of corn 27.7 per cent, while the other factors mentioned took off only 4.4 per cent more. The corresponding estimates for potatoes are 20.7 and 9.3, and for cotton, 22.3 and 13.2 per cent.

CHARLES F. BROOKS ·

**Weather and the Pioneer in Arkansas.** An account of "Weather and Crops in Arkansas, 1819 to 1879," gleaned by W. C. Hickmon from Little Rock newspapers and published in the *Monthly Weather Review*, August, 1920, illustrates how large a factor was weather in the life of the pioneer.

The agricultural system of the pioneers at Arkansas Post (Little Rock) was well adapted to the variable weather. The farming was diversified—cotton, corn, wheat, potatoes, truck, fruit and cattle raising—and the uplands as well as the lowlands were cultivated. An average growing season would result in good returns; but, as now, average weather was exceptional. A hot season favored corn and cotton; a cool one the root crops, wheat and pasturage. A wet summer, if not too cool, was fine for corn, potatoes, and cattle; but poor for cotton and wheat. In wet seasons the farmers on the uplands fared well, while those on the river flood plains lost their crops because of floods. When droughts occurred, however, only the lowlands gave fair yields. The early settlers used the Arkansas River as their highway for taking cotton to market and bringing back bacon, flour, provisions,

newsprint, etc.; but low water or ice frequently interrupted trade. When there was high water, on the other hand, the overland mails did not arrive, because of unfordable streams.

The reading of Mr. Hickmon's article impresses one with the familiar succession of unusual storms, floods, snows, and mild winters. It affords a demonstration of the fact that our weather, variable though it is, is essentially constant, a matter of importance in the study of geographic influence.

CHARLES F. BROOKS

### SOUTH AMERICA

**The Colombia-Ecuador Boundary.** The Ecuadorian Government has recently published a document entitled "Arreglo de límites entre las Repùblicas del Ecuador y Colombia, documentos oficiales" (Quito, 1920), which gives an account of the demarcation

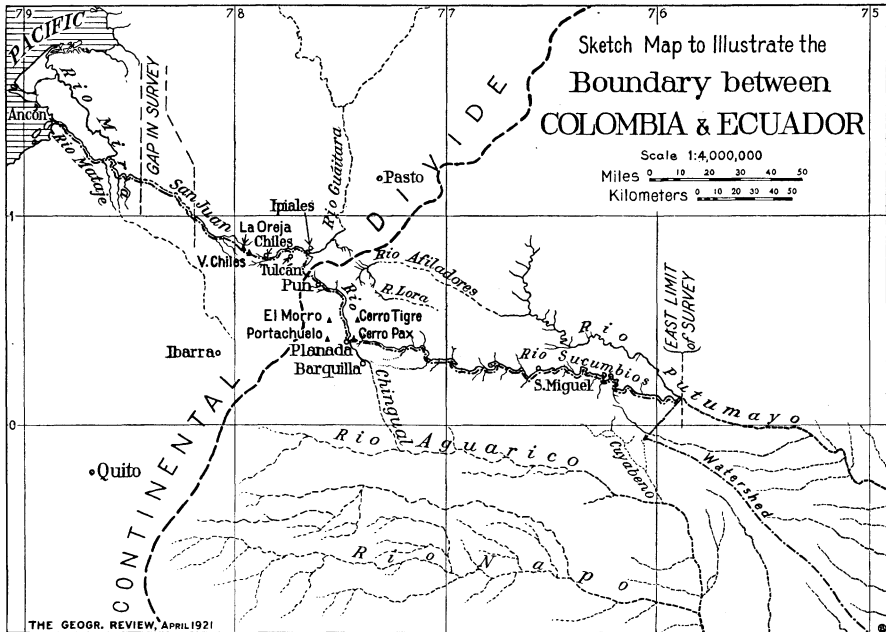


FIG. 1

operations on the boundary with Colombia. This boundary had been defined by the treaty signed at Bogotá on July 15, 1916, and of which ratifications were exchanged on January 26, 1917.

The maps accompanying this document are of peculiar interest, as they are based on trigonometric data and precise measurements, and provide a zone of accurate survey across the Andes in a hitherto unsurveyed section. Unfortunately the quality of the reproduction falls far short of that of the work which the maps represent. The surveys were executed by a joint commission operating in three sections, from the mouth of the Mataje River on the Pacific coast to the watershed between the Napo and Putumayo Rivers.

The boundary commission showed that the definition included in the treaty had been based upon inadequate knowledge of the topography, and found it necessary to make important modifications in a number of places. For instance the line was to follow the San Juan River upstream to the mouth of the Agua-Hedionda valley, and thence up this valley to its head on the Chiles Volcano, and to run from this summit to the source of the Carchi River. The Commission states that the Hedionda valley does not exist, and that the Carchi River has three sources on Mt. Chiles.

The boundary survey has resulted in the fixing of a large number of positions, and in placing the confluence of the Putumayo and Sucumbios nearly sixty miles west of its

supposed position. It has revealed the sources of two east-flowing rivers—Afiladores and Lora, while it has greatly changed the courses of the rivers surveyed. It is interesting to note that the new survey crosses at Tulcán the northern extremity of the chain of geodetic triangulation carried out by the French Mission in measuring the arc of meridian from Payta (Peru) and completed in 1907.

The position of the new boundary is shown on the accompanying sketch map which has been compiled from the maps of the boundary commission. It was apparently considered unnecessary to survey sections where the location of the boundary was not in doubt. Thus there is a gap in the work on the San Juan River, and the southeastern terminal of the demarcated line is the point where the watershed between the Putumayo and the Napo is attained.

While the two Republics are now agreed upon their common frontier, the eastern extremity of this line cannot be regarded as settled until both Colombia and Ecuador come to an agreement with Peru, whose territorial claims in Amazonia overlap those of both countries.

**The Coastal Belt of Peru.** Fellows of the Society who had the opportunity of hearing Mr. Robert Cushman Murphy lecture on the subject of "The Humboldt Current and the Islands of Peru" will be interested to know of his published results under the title of "The Seacoast and Islands of Peru" (*Brooklyn Museum Quart.*, Vol. 7, 1920, and Vol. 8, 1921). Mr. Murphy's studies are not confined to the habits and distributions of the guano birds but embrace the physical environment and its life relationships. Among the illustrations are eight distributional maps showing either the ranges or the breeding places of various vertebrates, chiefly of the western coast of the Americas. The relative constancy of physical conditions on the Pacific coast is in strong contrast to the periodicity that marks the Atlantic coast and is reflected in two outstanding features: (1) an extraordinary latitudinal range of distribution of groups of animals of far northern and far southern origin and (2) an equally extraordinary abundance of higher vertebrates in littoral waters of low latitudes. These results are closely correlated with the physical conditions, particularly the well-known phenomenon of upwelling sea water along the coast.

Previous to the publication of Mr. Murphy's paper there appeared a paper on the same subject with notes on climate and economic geography (R. E. Coker: "Habits and Economic Relations of the Guano Birds of Peru," *Proc. U. S. Natl. Museum*, Vol. 56, 1920). Mr. Coker points out that while fog and mist are a common feature of the mainland coast during the winter, the offshore islands are practically free from rainfall, so that only upon their higher peaks is there sufficient precipitation to support ordinary vegetation. The result is that "the nitrogen of the guano deposited by the birds cannot become converted into ammonia to be lost by evaporation, but is permanently preserved in a form readily available for the purposes of agriculture." It is pointed out that the absence of rains and storms has a certain effect also upon the abundance of available food and upon the successful propagation of the birds. The correctness of this generalization is tested by finding that nearer the Equator, where the sea breeze is warmer and contains more moisture, light rains are not unknown, as at Lobos de Tierra, in latitude 6.5° S., and here small patches of vegetation may be found and "an inferior quality of guano."

In an appendix Mr. Coker presents a map, reproduced from the *Geographical Review*, showing the location of the Guano Islands. In brief introductory sections the general features of the coast and the character of the Peruvian Islands are set forth and the conditions of the surface water noted. (For a fuller discussion of Peruvian coast temperatures see a paper by the same author on "Ocean Temperatures off the Coast of Peru," *Geogr. Rev.*, Vol. 5, 1918.)

In describing the guano-producing species, Mr. Coker uses the phrase "billion-dollar birds," in view of the fact that between 1851 and 1872 ten million tons of high grade guano were extracted from the Chincha Islands with a pre-war value of three-quarters of a billion of dollars; and in addition there is the value of the guano extracted since that time. In the first years of this century the exports were one hundred thousand tons a year, and in the years 1906-1908 twenty thousand tons of the highest grade were produced.

The main body of the paper is devoted to a detailed description of the chief guano-making birds—their habits, their biological character, the economic importance of each in the general scheme. The most important bird is the cormorant, which outranks all others on the coast in significance as a guano producer and has always had the name of the "guano bird" or *guanay*. In comparatively new guano deposits formed by the cormorant there is

a content of 14 to 17 per cent of nitrogen; in old buried guano preserved from past generations there is a nitrogen content of 12 to 14 per cent, indicating almost perfect preservation owing to the practical absence of rain. As a consequence of the high value of these birds in the economy of Peru, elaborate regulations have been established for their protection—a highly developed form of state conservation.

The closing sections of Coker's paper deal with the relation of sea lions to the birds as enemy and competitor and contain historical notes on the work of earlier observers. The paper throughout contains footnote references of distinct value to the student of the economic geography of Peru.

## EUROPE

**Studies in City Geography: Edinburgh and Glasgow.** Some time ago the Scottish Geographical Society formed a Committee for a National Collection of Old Maps of Scotland. A result of the activity of the Committee is the publication in the Society's magazine of two studies in city geography, Edinburgh (August-September-October, 1919) and Glasgow (January, 1921). In both instances the development of the city is traced from the earliest times, progress being illustrated by a unique collection of maps, views and sketches. The expansion of Edinburgh is admirably summarized in a map in color (scale  $\frac{1}{2}$  inch to 1 mile) by the late J. G. Bartholomew. The two studies have in common the fundamental geographical exposition lately defined by Dr. Fleure (Some Types of Cities in Temperate Europe, *Geogr. Rev.*, December, 1920) as the "complex interweaving of environmental influence and cumulative human effort." The method of treatment however is as different as is the history of Scotland's two capital cities: Edinburgh, cultural city and political capital tracing its fortunes to its defensive site on the "well-nigh impregnable Rock" looking eastward over the Firth of Forth; Glasgow, the commercial capital (third city of the British Empire, Calcutta being second), westward-looking with colonial traditions and a present-day fame as the world's greatest shipbuilding center.

Edinburgh is treated by Professor Patrick Geddes from the standpoint of town planning. He discusses shortly what has been done in the way of a civic survey and interprets present conditions in the light of their origins, outlining the growth of the city through ancient, medieval, renaissance, and industrial stages. The city particularly well lends itself as an illustration of his thesis that "each generation, and in this, each essential type, must express its own life, and thus make its contribution to its city in its own characteristic way." At the same time the past makes itself felt. The notorious conditions of squalor and overcrowding in the old city are a legacy from its ancient position as a city of refuge.

Influence of the past in the form of geographical inertia is the theme of the epilogue to the study of Glasgow, a note on the future of the city by Sir Halford J. Mackinder. The point is of basic importance yet is quite commonly overlooked by the student of the "influence of geographic environment." One cannot do better than quote it here.

"It is necessary to invoke momentum from the past in order to explain the greatness of many of the oldest centers of urban life. Geographical analysis alone will not be enough without the inclusion of 'compound interest' on the original geographical capital. You may analyze the position of Glasgow and show that it was founded on the nearest solid ground to a ford across the Clyde, and that the paths up and down the valley here crossed the paths from the hunting grounds of Strathmore and Kyle; but you have so only given the reasons for the placing of a big village. St. Ninian and St. Mungo established a home of missionaries at this focus of pathways into the wild, and so you explain a little episcopal city. Under the protection of her bishops, Glasgow's market outstrips Renfrew, Dumbar-ton, and Rutherglen, so that the traffic comes by the converging paths from farther afield; you have still only added a High Street of shopkeepers to a cathedral close. The Union of 1707 gives Glasgow the opportunity of importing the sugar and tobacco of Scotland; you have now accounted for Jamaica Street. Finally the exploitation of the Lanarkshire coal and iron gives you an industrial area with a few hundred thousand workers. But Kelvinside and Clydebank, the city of a million within and half a million more without the municipal boundary, is only to be explained by the fact that being a great going concern Glasgow has changed her geographical environment, has brought the seas to her doors and made tributary distant ores and granaries. It is in short an independent geographical fact that you have beside the Clyde not only deposits of coal but in these days also a deposit of human energy and skill and habit of working together. The result is that in a far corner of the



damp and chilly north, in a little sterile land, beside an unnavigable mountain torrent, we see a great world-center. No one would have deepened the Clyde unless Glasgow had already been there. To him that hath shall be given."

This however is not to underestimate the possibilities of the Glasgow region of which in successive times successive advantage has been taken. The development of these latent possibilities is completely traced in the several chapters which include the geographic factor (by Prof. J. W. Gregory), the people, cathedral and bishopric, municipality, port, and overseas relations.

**Coal and Iron in the Political and Economic Geography of Northeastern France and Western Germany.** The greatest industrial effects to follow the territorial changes required by the successive treaties of peace will take place in northeastern France and

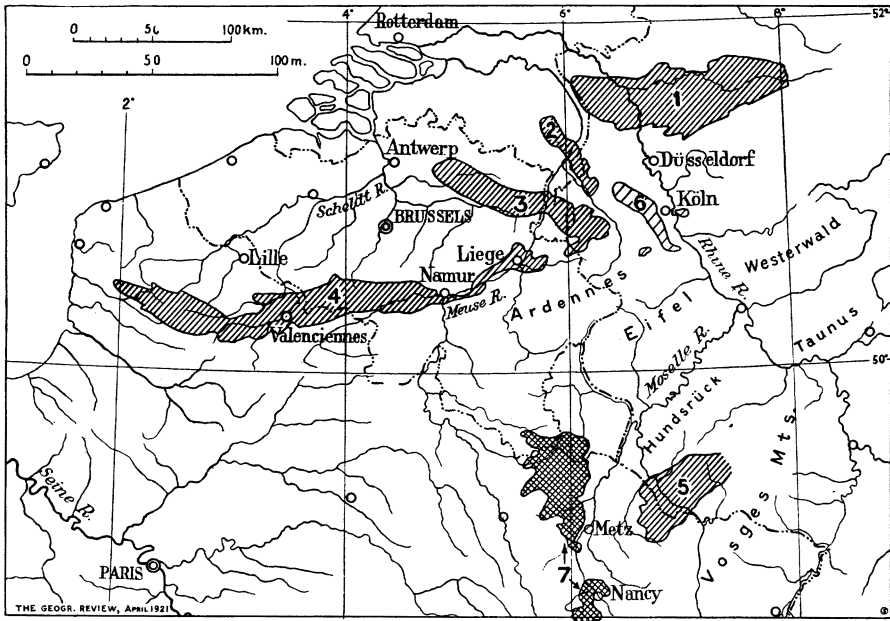


FIG. 1—Sketch map showing the relations of the Lorraine iron ore district and the tributary coal fields. References on the map are (coal fields): 1, Westphalian; 2, Brüggen-er-Erkelenz; 3, Campine-Aix-la-Chapelle; 4, Valenciennes-Namur; 5, Sarre. 6, lignite field of Cologne; 7, iron ore district of Lorraine.

western Germany on account of the transfer of Lorraine Annexée—that part of Lorraine taken from France in 1871 and restored in 1919. This district contains 48 per cent of the European iron reserves. To detach it from the iron and steel industry of Germany and to add it to that of France is not a simple process. The industrial effects of the transfer of so great a mineral deposit involves the study of the sources of coal and coke which, before the war, were drawn upon in the reduction of Lorraine ore. In addition one must take into consideration the effects that will follow upon the transfer of political control of the Sarre basin during the fifteen years that must elapse before a plebiscite is to determine final ownership. In any case the treaty of Versailles gives France outright ownership of the mines. Thus the political consequences of the treaty and its economic consequences are involved in an extremely complicated manner on the common frontier of France and Germany.

In the study of these consequences as they will unfold themselves in the ensuing decade of economic reconstruction it is of vital importance to know the extent of the reserves of iron ore and coal in the several fields; the economic and transportation relations that obtained before the war; and the most economical relation that must be maintained if both France and Germany are not to suffer as a result of the changes in territorial ownership.

Such a study has been made by one of the highest authorities in the country, Dr. Alfred H. Brooks, in a report published by the United States Geological Survey ("The Iron and Associated Industries of Lorraine, the Sarre District, Luxemburg, and Belgium", by A. H. Brooks and M. F. La Croix, *U. S. Geol. Survey Bull.* 703, 1920).

In this brief notice it is perhaps sufficient to characterize the main geographical relations emphasized in the report. In a series of graphs and maps there are presented the geographical relations of the several deposits; the ratio of iron reserves of each country to the total for all Europe; the place of the coke industry in the industrial scheme; the production of coke in France by *départements*; the position and industrial status of the Westphalian coal fields; the part played in German steel production by the Sarre coal field; and finally, the very interesting conclusion that, unless there is an exchange of raw material in the form of the iron ore of Lorraine for Westphalian coke and coal, the economic use of these reserves will be prevented. Political action might in such a case deflect natural economic processes thereby raising the cost of iron and steel production to the disadvantage of "the average European whatever his nationality," besides preventing French and Belgian iron

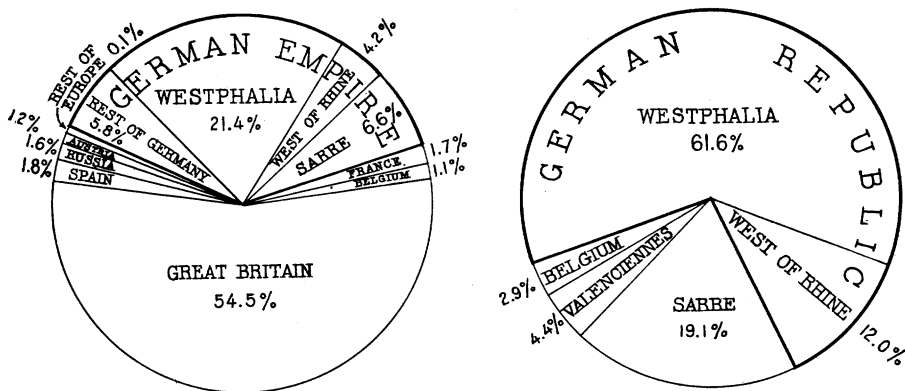


FIG. 2.—Diagrams showing percentage of coal reserves: on the left, the national ownership of coal reserves in Europe in 1913; on the right, coal reserves tributary to the Lorraine iron district in 1919.

and steel products from competing in the world market. While the argument is not carried forward into the political field it is easy to apply it to the entire policy of reparations. Thus, along with many other considerations, matters of territory and economic geography bring the thoughtful person back to the question that has been raised in a hundred forms since the treaty of Versailles was signed, as to how far Germany can meet her reparation payments and yet be prevented from reorganizing her economic life along the old lines.

Turning from the general features of the report to the details it may be noted that in no existing publication can one find in such mobile form the facts necessary for a discussion of the problems of economic geography that are posed by the stipulations of the treaty of Versailles respecting Lorraine Annexée and the Sarre. Whether one wishes to study the question of production or transportation; whether one is interested in the question of the sources or that of the dispositions of iron and steel products, he will find the information in practically any desired form. The separate map entitled "Map of Lorraine Iron Districts and Tributary Coal Fields," on the scale of 1:600,000, supplies the geographical outlines of actual producing areas of iron and coal in northwestern Germany from the Westphalia basin to the Sarre, westward to Valenciennes and southward to the Marne-Rhine Canal. While the relief is not shown on the main map it is supplied in a small sketch map (Pl. II) which also gives the features of the main map in less detail. The small map is reproduced herewith omitting the relief, and there is also reproduced a figure showing the national ownership of coal reserves in Europe in 1913 and of the coal reserves tributary to the Lorraine iron district in 1919. The diagrams are accompanied by tables which express the tons of known coal in the reserves and the percentages of the total represented by the principal fields. The total reserves for all Europe in 1913 are given as 248,493,000,000 tons, and the percentages of this total for the different fields have been transferred to the diagram

in redrafting it for the purposes of this note. Percentages of known coal reserves tributary to the Lorraine iron district in 1919 (86,640,000,000) are likewise transferred to the corresponding figure and show in a striking manner the interdependence that must be established between the German coal fields and the French iron-ore fields of Lorraine if either France or Germany is to have a normal industrial life.

**Recent Studies of Glacial Variations in the French Alps.** Recent studies both in the field and in the archives of Chamonix have furnished a fairly complete history of glacial variations in the French Alps since the close of the sixteenth century. (Ch. Rabot: *Les catastrophes glaciaires dans la vallée de Chamonix au xvii<sup>e</sup> siècle*, *La Nature*, August 28, 1920). For a long while before 1600 the glaciers on the massif of Mont Blanc were certainly no more and probably much less extensive than they now are. This is indicated not only by documentary evidence but by many old traditions testifying to the former use of passes now impracticable on account of ice. In the first decade of the seventeenth century, however, there began a long age of glacial enlargement that lasted into the nineteenth century. In 1604 advance of the front of the Mer de Glace swept away several houses in the valley and forced the inhabitants of others to abandon their homes. Corresponding damage was done by the neighboring Glacier d'Argentière. An equally destructive "flood" of ice is chronicled between 1609 and 1611, and 1641-1644 was made memorable by the most formidable encroachment of all. A period of minor oscillations then followed until a great advance in 1714, which in turn was succeeded by a gradual but slight recession between 1714 and 1775 and a general period of growth until 1818-1822 when the ice had almost reached its maximum of 1644. "Flood" conditions persisted thence until about 1850, after which there set in that great shrinkage characteristic of the latter 19th and early 20th centuries, which has probably resulted from a combination of three causes: a general rise in temperature, a diminution of precipitation, and an increase in insolation.

Within this broader period of glacial retirement since 1850 there have been two minor advances, one between 1880 and 1890, and the other since 1910 (see the note, "Recent Developments in the Theory of Glacial Variations," *Geogr. Rev.*, Vol. 6, 1918, pp. 75-76). Between 1914 and 1919, inclusive, the Glacier du Tour has advanced an aggregate of 170, the Glacier des Bossons of 171.8, and the Glacier de l'Argentière of no less than 202 meters. Though perhaps on a less striking scale, the same phenomenon has been observed throughout the Alps and is undoubtedly the result of the relatively cool and wet conditions that have prevailed during recent years.

## AFRICA

**Changes in Population Grouping in the Anglo-Egyptian Sudan.** The Anglo-Egyptian Sudan with an area of over 1,000,000 square miles has a population of less than 3,500,000. The relative smallness of the figure is due in part to political events of the last century. Extension of Turkish rule with its ruinous system of taxation into the northern provinces of the Sudan devastated the cultivated areas along the Nile River and encouraged extension of the slave traffic. From Khartum as headquarters the traffic extended up the valley to the Uganda borders. Sir Samuel Baker estimated that at least 50,000 slaves were captured annually during the years immediately preceding 1869, the date of his expedition for its suppression. This work begun by Baker and continued by Gordon was barely completed when the revolt of the Mahdi broke out (1881). Under his régime and that of his successor the Kalifa, war, massacre, famine, and disease cost, according to Sir Harry Johnston, 3,000,000 lives.

The reconquest of the Anglo-Egypt Sudan in 1898 inaugurated an era of peace of which the influence is now penetrating the farthest borders. During the war a source of potential trouble was removed by conquest of the revolting Ali Dinar, sultan of Darfur, and the subsequent incorporation of his semi-independent kingdom as the fifteenth province of the Sudan. The power of British authority was recognized in the picturesque ceremony that took place in London in 1919 when the golden sword of the Mahdi was surrendered to the Imperial Sovereign of the British Empire. Not that the Pax Sudanica is completed. On the remote borders tribal warfare still exists. In 1917 for instance a punitive expedition was sent into the Dinka country east of the Bahr el Gebel to protect the tribute-paying Dinkas from their warlike Nuer neighbors (J. Stevenson-Hamilton: *The Dinka Country East of the Bahr el Gebel*, *Geogr. Journ.*, Nov., 1920). More recently rebellion broke out

among Dinka peoples west of the river (in Mongalla) during the course of which Major Stigand was killed to the serious loss alike of British administration and African geography.

But the work that has been accomplished in the Anglo-Egyptian Sudan is notable. An illustration of its results is given in a recent number of *Sudan Notes and Records* (April, 1920) by J. W. Crowfoot in his discussion "Old Sites in the Butana." Butana is a "cotton soil" region lying back of the sandstone belt that stretches along the right bank of the Nile between the Atbara and the Blue Nile. It lies on the edge of the "rainland," the annual rainfall according to Peacock's map for 1905-1909 being between 7 and 11 inches (A Report on the Land Settlement of the Gezira, Anglo Egyptian Sudan). Traveling over three hundred miles in the region the author saw scarcely a single built house and very few grass huts, yet there were far more people than had been expected. "We never had any difficulty in finding an Arab *ferik* every two or three hours." All the *feriks* were small, never more than 30 tents and usually only 3 or 4 to 12 or 15. Formerly the tribes moved about in bands 200 to 300 tents strong; "at each halting place the tents were pitched in long rows, and every fifteen to twenty days the drums were beaten, the servants used to strike tents and the whole camp moved to a fresh grazing ground." This is a form of social organization adapted to defensive or offensive purpose. Now that raiding has been put down by the government each family or small group can live by itself. Its smaller flocks can be grazed for months from the same camping ground and it therefore tends to become sedentary, turning more and more to agriculture where soil and water conditions permit. As yet the tent and its equipment have remained much the same as of old, but certain other changes in the nomad economy are in progress. The necessity of meeting the government taxes, the price of security, leads to the regular sale of animals in such markets as Khartum and Omdurman. The surplus cash is expended in the satisfying of new wants and trade grows.

The change from nomadic to sedentary occupation of the region is regarded by Crowfoot as a reversion to a former type. His argument is based on the remains of settlements which flourished in the Meroitic period about the beginning of the Christian era. He believes that there has been "no essential change in the water supply within the historic period," the growth of nomadism being not the result of increasing aridity (in the region itself) but of political factors—invasion from the north.

## WORLD AS A WHOLE AND LARGER PARTS

**The Decline of Europe.** Under the above title Professor Demangeon, of the Sorbonne, has written a small but intense book on the disruptive changes in economic geography that have disadvantaged Europe as a result of the World War. Dealing as he does with inflated values, the disproportion of trading power between the Europe of 1914 and the Europe of today is fictitiously large. This caution must be constantly kept in mind in reading Demangeon's text for while he recognizes the existence of inflated prices he does not and could not make full allowance for them because they are in constant change and their curve of probability cannot be predicted. For example, since the publication of the book, natural remedial forces have been at work and their results have already weakened some of his conclusions. Trading advantages which the United States temporarily enjoyed in South America as a consequence, in part, of our greatly increased shipbuilding activities, have been largely offset by the ensuing lethargy of merchants and government officials and by a rigid credit system which is in unfavorable contrast with the flexible system of British and French bankers engaged in the financing of South American commercial enterprises.

Even if one take into account all of these precautionary principles and facts, Professor Demangeon's book still remains absorbing as to facts and startling as to conclusions. The loss of life in European countries as a direct consequence of the war, the heavy indirect loss of life, the diminished birth rate, the renewed emigration of European peoples to the New World—these are facts of the first order and handicap the European nations everywhere in the revival of overseas trade. Two nations, the United States and Japan, have greatly increased their gold reserves, their exports, their shipping, their foreign agents, and their command over and absorption of the raw materials of industry.

In the case of both Japan and the United States there has been a marked increase in power of commercial penetration in the East Indies and in South America. Japan's imports of raw materials from India and the East Indies are as noteworthy as her recent acquisition

by treaty of special rights and privileges in China, especially in Shantung, and her access of advantage in cable communication and commerce by acquiring a mandate for the scattered island holdings of Germany in the northern Pacific. Her hold upon Manchuria has been greatly increased by intensive methods of control first applied as a part of the process of maintaining a Siberian front against the Bolsheviks and later by unfair means of competition in acquiring mining and forestry rights. Tending to still more effective Japanese control of the whole Far Eastern trading realm is her long occupation of Siberia and of northeastern China during the past two years. These changes would have less significance if they represented part of a general prosperity which the entire world enjoyed with normal increase of population and commercial power. But one of the main points of Demangeon's thesis is that they have been gained in precisely that period in which the European nations, preoccupied with war, have lost many of the advantages they once enjoyed; so that even in New Zealand and Australia Japanese goods of almost every variety have been imported in astonishingly large amounts.

The entire story of Europe's relative decline is too long to be detailed here but reference should be made to a publication entitled "Japan: Trade During the War, A Study of the Trade of Japan, Particularly During the Years 1913 to 1917 and with Special Reference to the Trade with the United States," published in 1919 by the United States Tariff Commission. In 1913, 47 per cent of Japanese imports came from Asiatic countries and 43 per cent of her exports went to Asiatic countries. Trade with European countries accounted for 27 per cent of the total and the trade with North and South American countries amounted to 23 per cent, of which 22 per cent was with the United States. The next largest trade was with China, and after that, with British India, each of which amounted to about 15 per cent of the total. In the period from 1913 to 1917 trade with the United States increased more rapidly than that with any other country trading with Japan; and exports of Japanese goods of the classes of "completely manufactured articles" and "partially manufactured articles" rose to about four times the value of exports for 1907 and about  $2\frac{1}{2}$  or 3 times the exports for 1913. The increase in the *volume* of commodities imported into Japan from 1913 to 1917 was roughly somewhat over 100 per cent, and the same may be said of the volume of the principal commodities exported from Japan. Whilst the trade of Japan with the United States is of great importance to the former country, it is of less importance to the latter; for in 1913 our total trade with Japan was but 3.49 per cent of the total United States trade and in 1918 this figure had risen to 6.23 per cent. No other American commodities were exported to Japan in 1917 in such quantities as iron and steel, American firms now furnishing about 70 per cent of all iron and steel products imported into Japan.

The value of such analyses as those of Demangeon and of the Tariff Commission will be found chiefly in comparative studies now under way, or to be undertaken, in the long reconstruction period in which the whole world is involved and it will certainly follow that very grave changes in the flow of capital for development purposes and in the exchange of commodities of every kind will take place as a consequence of the unequal burden which the war imposed upon all nations involved in it and the immensely disturbing effect which the war had upon sea-borne commerce of every kind. Only when these comparative studies are available will the actual relative decline of Europe become known. (In this connection see also J. Russell Smith: *Influence of the Great War Upon Shipping, Preliminary Economic Studies of the War*, Carnegie Endowment for International Peace, 1919.)

**The World's Copper Production.** Under this title Dr. F. H. Hatch gives a short survey of the changes in amount and source of copper production in the last 120 years (*Geological Magazine*, January, 1921). At the beginning of the nineteenth century the world's production was some 15,000 metric tons of which a very large share was contributed by the United Kingdom; the rest came chiefly from Russia (Bogoslovsk), Japan, Chile, Sweden (Falun), Norway (Rörös), and Germany (Mansfeld), in the order named. By the middle of the century rapid growth of the engineering trades had raised consumption to about 60,000 tons and new supplies were now being furnished by the British Colonies (Australia and the Cape), the United States, and Cuba. During the next two decades the fairly steady increase in demand was largely met from Chile which country figured as the leading producer in 1870, the United Kingdom occupying second place. From this point onward the outstanding features of the industry are the rapid acceleration of output due to the demand for electric power generation and transmission and the great share contributed by the United States which in 1883 rose to the rank of first producer (26 per

cent of the total of 199,000 metric tons). At this time the output of the United Kingdom had fallen to 1 per cent. At the beginning of the twentieth century the chief producers with percentage produced were: United States (51.5), British Empire (11.5), Spain and Portugal (10), South America (8), Mexico (6), Japan (5), Germany (4.5). During the first decade of the century the total production amounted to 7,333,000 tons. The United

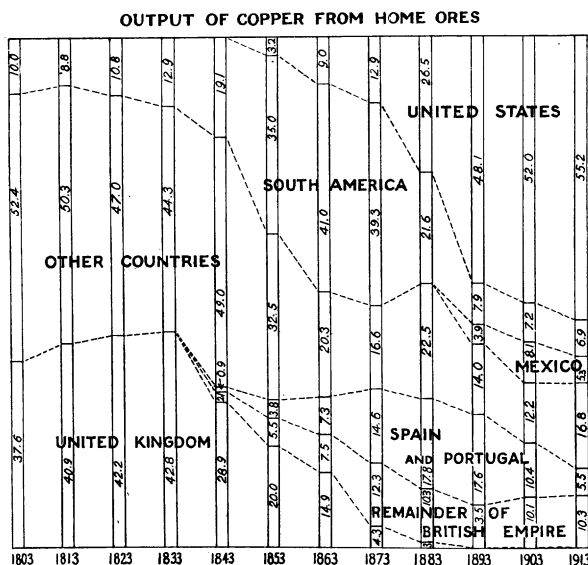


FIG. 1

States, South America, Mexico, and Japan practically doubled their production, and Serbia and German Southwest Africa appeared on the list of producers. It is estimated that the output of the last decade will exceed 10,000,000 tons, or more than the entire production of the last century.

## HUMAN GEOGRAPHY

**Atmospheric Moisture: Its Significance and Terminology.** Not only does great uncertainty still exist as to the real significance of atmospheric moisture, but also great variation in terminology (compare the letter from Dr. Leonard Hill quoted below). As the best means of denoting the relation of water to the atmosphere for the purposes of physiological meteorology, the following terms have all had their advocates: (1) relative humidity; (2) wet bulb temperature; (3) dew point; (4) vapor pressure; and (5) vapor content. Each of these terms holds a distinct and important place in meteorology, and all are closely related. If the temperature of the dry bulb thermometer is given, a knowledge of any one of the other conditions makes it possible to determine the remaining four, provided the relatively slight effect of atmospheric pressure be ignored. Hence in the hands of a skillful scientist it makes little difference which is employed, provided the dry bulb temperature is always stated. For the sake of avoiding confusion, however, and in order to make the matter as simple as possible for the layman who wishes to utilize climatic data for health, pleasure, or profit, it is highly desirable that a single term be employed universally and that this term be one that can be easily comprehended.

As a help in this direction it may be worth while to state my own experience. Till recently I used the term "relative humidity" exclusively. I took pains always to state the temperature and believed that by so doing the possibility of misunderstanding would be avoided. I have found, however, that even climatic specialists both in America and abroad sometimes gain the surprising impression that a certain degree of relative humidity, no matter what the temperature, is supposed to have an importance. On the other hand, a long series

of studies shows that the best health prevails when there is a perfectly definite amount of water vapor in the air. The ideal amount seems to be approximately 5 grains per cubic foot, which is equivalent to a relative humidity of about 80 per cent when the temperature is 64° F. or 60 per cent at 72° F. No matter how high the temperature rises, approximately the same amount of water vapor seems to be desirable, which means that at 90° the relative humidity should be about 35 per cent. A departure from this amount of moisture seems to be attended by discomfort and injury, whether the air be too dry or too moist. Of course a small departure is not particularly harmful, and any condition of the air in which there are present between 3 and 7 grains of moisture per cubic foot seems to be fairly favorable.

At low temperatures the air cannot contain as much as 5 grains of moisture per cubic foot, for at 56° F. that amount of moisture means complete saturation. At 16° F. the air can contain only one grain of moisture per cubic foot. When such air is taken into our heated houses it does much harm to the mucous membranes. For some reason, however, it does not seem to do so much damage when breathed out of doors, perhaps because the low temperature causes a stimulus which partly offsets the bad effect of too little moisture. Nevertheless, the lack of moisture in the cold winter air may be one reason why it often causes discomfort and leads to respiratory troubles even when breathed out of doors. So far as the lungs themselves are concerned the effect of dry cold air is essentially the same as that of dry warm air, for by the time it reaches the lungs it has been warmed. Apparently the lungs are so organized that, when they receive air with 5 grains of moisture per cubic foot, they are easily able to add another 10 grains or so in order to saturate the air after it has been raised nearly to blood heat. If much more moisture is required in order to saturate the air, the lungs are compelled to work under a strain; if less is required, the lungs do not give out enough water to preserve the proper balance of internal temperature, and the body is called upon to resort to other methods in order to maintain equilibrium.

Because of these conditions it seems to me advisable to use the term "vapor content" in studies of the relation of the air to health. This term would have the great advantage of being readily comprehensible to the laymen and of being so definite that neither the layman nor the scientist could well misunderstand it. It is to be hoped that the term "vapor content" may be widely used. I regret that I have not used it hitherto.

ELLSWORTH HUNTINGTON

**Dr. Leonard Hill on Ventilation, the Katathermometer, and Humidity.** In the April-June number of the *Geographical Review* for 1920 the writer reviewed (pp. 362-363) an important article, "Atmospheric Conditions Which Affect Health," by Dr. Leonard Hill. The writer briefly discussed therein the katathermometer devised by Dr. Hill and the conclusion derived from observations made with this instrument. After the review had appeared a letter was received from Dr. Hill which clarifies several points.

(1) Through a stenographic error it was stated that the method of reading the katathermometer is to take the time required for the mercury to fall from 100° F. to 90°. This should have been 100° to 95°.

(2) Dr. Hill does not believe that the climate of dry hot places, like Jhansi in northern India, is more healthful than that of places that are cooler and moister. He merely points out that such dry heat with rapid motion of the air may cause the "kata" to fall as rapidly as it would in a much more favorable climate.

(3) The further points made by Dr. Hill may best be given in his own words: "You state that the speed at which the kata falls depends upon the temperature of the surrounding air and on the rate of movement of the air. May I correct this statement and say that the rate of fall depends on the loss of heat by radiation and by convection; and that convection depends on the temperature of the surrounding air and on the rate of movement of the air; and that the last factor—namely, the rate of movement—is far the most important, just as it is in the human body."

(4) In actual practice the use of the kata by other than trained workers is not found to be highly complex. "It is very easy to heat the instrument three or four times in succession and take readings of the rate of cooling with an ordinary watch. For ordinary purposes the first of these readings need not be rejected; to divide the average time in seconds into the factor number which is printed on the stem cannot be called a difficult operation, and a table could easily be prepared which would save the observer the trouble of doing this division. I can teach any laboratory boy in five minutes to use the kata."

(5) In regard to the kata as an indicator of the effect of mist, "my conclusion is that it does not show the full effect of the amount of radiant energy of the sun which is absorbed by the skin and the clothes and that the surface temperature of a piece of black fur must be taken in addition to the katathermometer readings in order to evaluate radiant energy."

(6) "The matter of humidity I consider with you of the greatest importance, but I think vapour pressure should be recorded and studied rather than relative humidity. I agree with you that the vapour pressure of the air in winter, which is heated and delivered in your American rooms, being exceedingly low, necessitates your having a much higher temperature in your rooms than we have on this side, and therefore I entirely agree with all you have written about the matter of humidifying the air and so securing a comfortable lower temperature."

ELLSWORTH HUNTINGTON

### MATHEMATICAL GEOGRAPHY

**Three Early Fifteenth Century World Maps in Siena.** In the Palazzo Pubblico, or City Hall, of Siena there is a small chapel furnished with early Renaissance stalls, which were designed possibly by Taddeo di Bartoli and constructed by Domenico di Niccolo

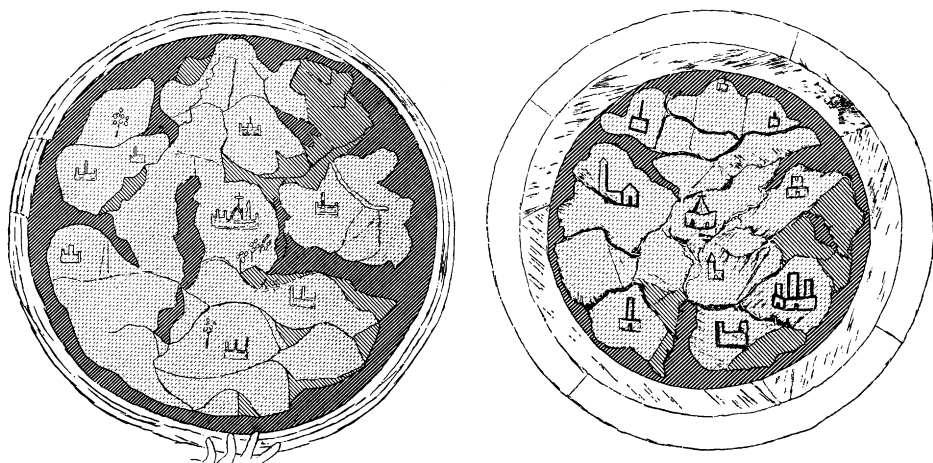


FIG. 1.—Tarsia world maps of the early fifteenth century, Palazzo Pubblico, Siena. A little less than half actual size. The shading on the maps indicates the colors of the originals: dark shading represents green, medium represents dark brown, and light represents light brown.

between 1415 and 1428. The back of each stall at about the level of a man's head forms a panel upon which is depicted in colored wooden mosaic, or *tarsia*, a figure, either of God or of an angel. In three of the panels a rough map of the world forms part of the design. In one (Fig. 1, left disc), God holds in his left hand a *mappemonde* about five inches in diameter; it is a typical medieval world disc resembling in its general form and outlines the famous Psalter, Hereford, and Ebstorf maps of the thirteenth century, although no names of places are given. Wood of three colors is used; light brown for the lands, green for the waters, and dark brown—perhaps a faded red—for the Red Sea. As was customary in most medieval Christian maps, Jerusalem is at the center, indicated by a church with dome and towers; the east with Paradise is at the top, and the four rivers of Paradise flow down over an earth encircled by the ocean, penetrated by the Mediterranean and Caspian Seas, and diversified by lakes and rivers. Six or eight cities—simple outlines of houses—are scattered about; also an occasional tree and marks which may or may not be symbolical of mountains, but as the map was the work of an artist and was made wholly for decorative purposes, we are hardly justified in trying to identify its details too accurately.



Another panel illustrates a phrase from the Apostles' Creed: "Factorem coeli et terrae, visibilium omnium et invisibilium." A large figure of God stands with right arm raised directly in front of and partly concealing the world. Houses, woods, rivers, etc., appear clearly on as much of the map as we can see.

The third panel (Fig. 1, right disc) shows a gloomy angel looking at a small *mappe-monde*, something like that of the first panel but cruder and less detailed. Jerusalem is again at the center, the mountain of Paradise at the top, and a dark-green ocean encircles the lands. Nine large towered cities add a touch of life.

These little discs are of importance, not so much because of their intrinsic value as maps, as for what they reveal regarding the status of geographical knowledge in their age. They express the geographical views of a typical early fifteenth century artist, probably an alert and fairly well educated man living in a large Italian city. More than a hundred years before, seafaring men were drawing accurate coast charts, or *portolani*, and world maps had already been compiled by the piecing together of the data contained in the charts. But it took long for these new and more correct conceptions to prevail against a theory of the earth's surface which had been built upon a standard interpretation of the Scriptures and which had behind it all the immense authority of the scholarship and tradition of the Middle Ages.

#### GEOGRAPHICAL NEWS

**Joint Meeting of the Association of American Geographers and the American Geographical Society.** At the building of the Society on April 21, 22, and 23rd, there will be held the annual joint meeting of the Association of American Geographers with this Society. A preliminary program is in preparation, and will be mailed to all out-of-town Fellows upon request. The final program will be distributed on Friday morning, April 22, and will also be printed in full, with a brief synopsis of each paper, in the July number of the *Geographical Review*. This brief preliminary announcement is made in order that anyone interested may have the opportunity of attending the meeting.